

Clyde Refinery Conversion

EIS Scoping Report

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Prepared for

Shell Company of Australia Pty Ltd

Prepared by

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Glossary of Terms

Abbreviation	Description
AGO	Automotive Gas Oil
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ASS	Acid Sulfate Soils
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CBD	Central Business District
CIV	Capital Investment Value
OEH	Office of Environment and Heritage
DCP	Development Control Plan
DEWHA	Department of the Environment, Water, Heritage & the Arts (Commonwealth)
DP&I	Department of Planning and Infrastructure NSW
EARs	Environmental Assessment Requirements
EECs	Endangered Ecological Communities
EIS	Environmental Impact Statement
EPL	Environment Protection Licence
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2007</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1997</i>
ha	Hectare
km	Kilometre
LEP	Local Environmental Plan
LGA	Local Government Area
MHF	Major Hazard Facility
ML	Megalitre
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	Megawatt
NES	National Environmental Significance
NGER Act	<i>National Greenhouse and Energy Reporting Act 2007</i>
NSW State Plan	NSW State Plan: A New Direction for NSW
PAC	Planning Assessment Commission
PFM	Planning Focus Meeting
PMA Act	<i>Ports and Marine Administration Act 1995</i>
POEO	<i>Protection of the Environment Operations Act 1997</i>

Abbreviation	Description
RTA	Roads and Traffic Authority NSW
SEPP	State Environmental Planning Policy
SEWPAC	Department of Sustainability, Environment, Water, Populations and Communities (Commonwealth)
SMR	Sydney Metropolitan Region
SPC	Sydney Ports Corporation
SSD	State Significant Development
t/h	Tons per hour
TSC Act	<i>Threatened Species Conservation Act 2005</i>

Executive Summary

Introduction

This Environmental Impact Statement (EIS) Scoping Report has been prepared by AECOM and is submitted to the Department of Planning and Infrastructure (DPI) on behalf of Shell Refining Australia Pty Ltd (Shell). The Scoping Report provides the DP&I with an overview of Shell's proposed Clyde Refinery Conversion Project (the Project) on the Parramatta River, NSW.

The Project

The proposal for the conversion of the Clyde Refinery would comprise:

- Conversion of part of the existing Clyde Refinery assets to receive, blend, store and distribute solely imported finished products to continue to be supplied to the existing Parramatta Terminal.
- Demolition of the existing processing units (excluding the existing Basell polypropylene unit).
- Current storage tank reallocation into final grades of fuel.
- Demolition of surplus storage tanks.

The major Project components include:

- Repair and preparation of current finished product and crude oil storage tanks to suit proposed terminal operation.
- Repair and improvements to tank bunding where necessary.
- Upgrades to tank instrumentation and tank control systems to enable remote and automated control.
- Installation of new inlet manifold systems and remote valves with segregated product distribution piping to respective tanks.
- Installation of a fixed fire system to replace the existing mobile fire service.
- Revised pumping and gantry supply piping systems.
- Revised site electrical systems.
- Revised site drainage and water treatment to suit reduced operation.
- Upgrades to safeguarding systems.
- Other site infrastructure to facilitate safe and efficient operations, e.g. lighting, safety shutdown systems, control room facilities and amenities.

This proposal does not include the works related to land restoration and possible redevelopment of the Clyde refinery site. This will be the subject of a separate application.

Purpose of the Scoping Report

This EIS Scoping Report has been prepared to describe the proposed conversion of the Refinery site. It provides background to the proposal and the market context within which the Project would operate, provides justification for the Project, sets out the environmental risk assessment undertaken, and outlines the potential environmental issues that need to be considered in more detail in the EIS.

Key Environmental Issues

The key environmental issues that have been identified for the Project and which would be assessed in more detail during preparation of the EIS, include:

- Social and economic effects;
- Air Quality and Odour;
- Noise and Vibration;
- Soil and Groundwater;
- Surface Water, Process Water and Flooding;

- Waste;
- Sustainability and Climate Change;
- Heritage; and
- Hazard and Risk.

Other Environmental Issues

Other environmental issues which would be considered in the EIS include:

- Terrestrial Ecology;
- Land Use ;
- Road Traffic;
- Landscape Character and Visual Amenity; and
- Infrastructure Provision.

As part of the preparation of the EIS, further assessments would be carried out to refine the potential environmental impacts of the Project and to identify mitigation and management measures to minimise impacts to the environment during construction and operation of the Project.

1.0 Introduction

1.1 Overview

Shell Refining Australia Pty Ltd (Shell) is seeking approval for the conversion of the Clyde Refinery for use solely as a finished fuels terminal. The Clyde Refinery is one of two Shell sites that are the subject of proposed works in connection with the refinery conversion project. The other proposal involves the upgrade of the Gore Bay Terminal into a solely finished fuels import terminal. The Gore Bay proposal is the subject of a separate application for approval. A further proposal may be made in relation to the land occupied by the Clyde Refinery processing units and potential remediation and/or subsequent redevelopment of that land.

Shell's Clyde Refinery is located at 9 Devon Street, Rosehill. This site comprises Shell's Clyde refinery and Parramatta Terminal. The refinery is currently used for the receipt and refining of crude oil and receipt of imported finished product from Gore Bay via a 19km pipeline. Finished products stored at the Clyde refinery site are then distributed by pipeline to Sydney Airport and Newcastle and via road haulage from the Parramatta Terminal to other sites as is the current practice. More than four million tonnes of crude oil, feedstock and products are imported through Gore Bay Terminal for transfer to Shell's Clyde Refinery by pipeline every year. Figure 1 and Figure 2 show the location of the site.

The refinery and terminal combined have around 310 employees and an average of around 200 contractors on site at any one time. Each year the refinery processes about 30 million barrels of crude oil and other feeds, and supplies in excess of 40 percent of Sydney's and New South Wales' petroleum requirements. The refinery and terminal operate 24 hours a day, 7 days a week.

The Clyde Refinery has been operating since 1928, however, as part of the decision to cease refining at Clyde, Shell have decided to convert the Refinery and Terminal into finished product import facilities to continue to supply the domestic fuel markets and capitalise on their existing land and infrastructure.

When the conversion from refining to solely a terminal operation is completed, finished fuel products and product components would be imported to the Gore Bay Terminal by sea tankers and transferred via the existing pipeline to the Clyde Refinery site for storage, blending and distribution. The quantity and capacity of petroleum fuels stored at the Clyde site will reduce significantly following conversion. The conversion will provide for anticipated increases in throughput due to anticipated NSW market growth.

The eastern section of the Refinery site would be modified to contain the finished product tanks required for continuing terminal operations. This area currently contains some of the crude oil tanks, intermediate product tanks and finished product tanks used in the current refinery operations. Some tanks currently in crude oil or intermediate product service will be cleaned and put into finished product service replacing finished product tanks located in the western section of the site to suit the ongoing terminal requirements (refer Plate 1).

The western section of the Refinery site contains the crude oil processing and blending facilities, crude oil, intermediate product and finished product tanks. Assets and processing units no longer required within this area will be decommissioned. Some of the existing assets within this area will continue to be used for an extended period following cessation of refinery processing while conversion work occurs in the Eastern area of the site to accommodate the effective terminal operations. Following completion of the conversion work, all redundant assets in the western area will be decommissioned, demolished and removed. The timeframe for the demolition and removal is still to be determined and will be shown in the EIS. The final use of the land in the western area is the subject of ongoing assessment and will be subject to a separate development application.

The conversion would reduce the number of tanks in use at Clyde from the current 36 tanks to the proposed 16 tanks. Products stored will include Unleaded Petrol 91, 95 and 98, Jet A1 fuel and Automotive Gas Oil (AGO) (refer Plate 2). In addition to these products, the site will continue to store LPG for use by Basell who are anticipating continued operation and Butane.

While Shell is still determining the final arrangement for the Project including tank configurations, it is Shell's intention to generally retain the existing tanks within the green-shaded area (refer Plate 1). If it becomes the case that tanks require removal and replacement, adjustments to ancillary infrastructure, such as drainage and surface water management, will be reviewed. Tanks within the green-shaded area not identified as required for immediate terminal use will either be cleaned and "mothballed" for future use or demolished and removed from the site.

Removal of some redundant equipment in the terminal area not expected to be used in the future terminal activities will take place and will be managed as part of the demolition works to be undertaken to remove the refinery processing plant from the site.

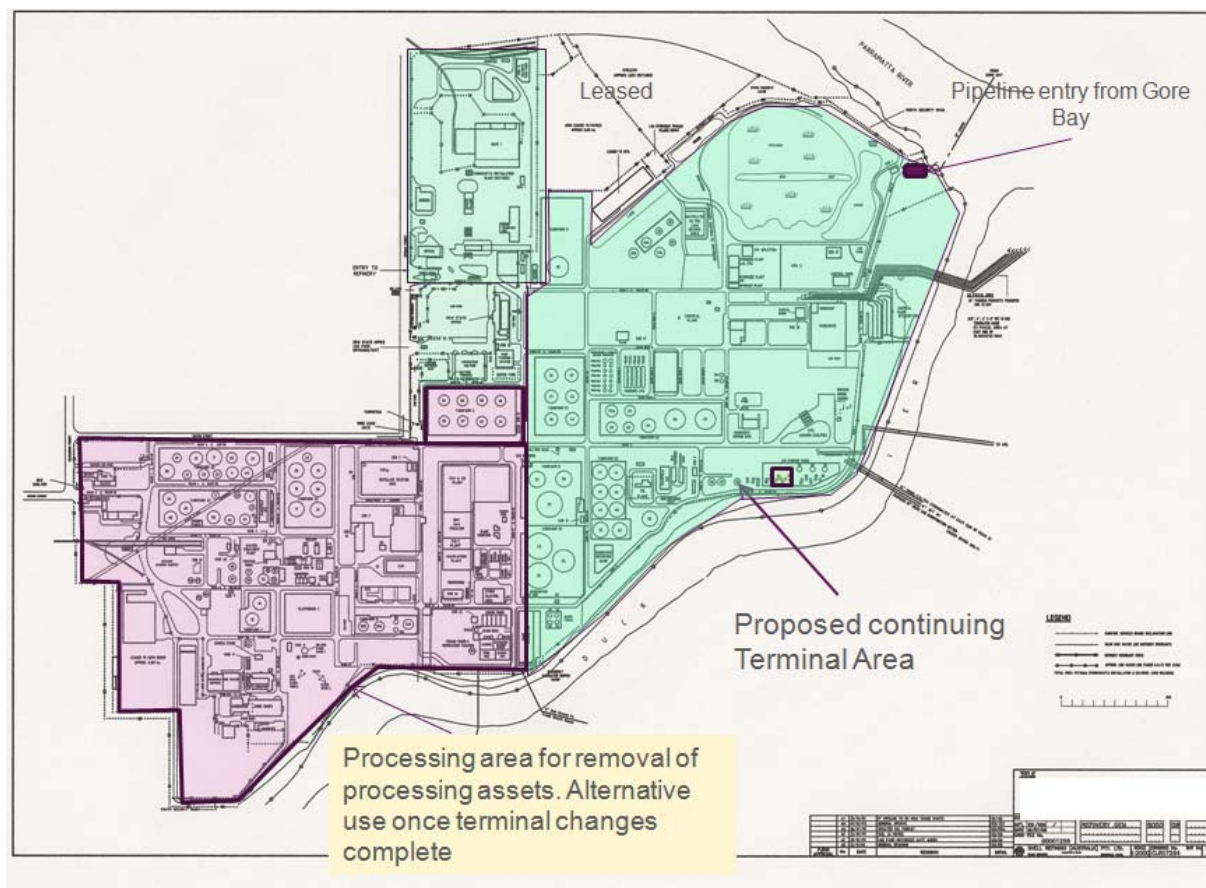


Plate 1 Proposed Land Use at the Clyde Refinery

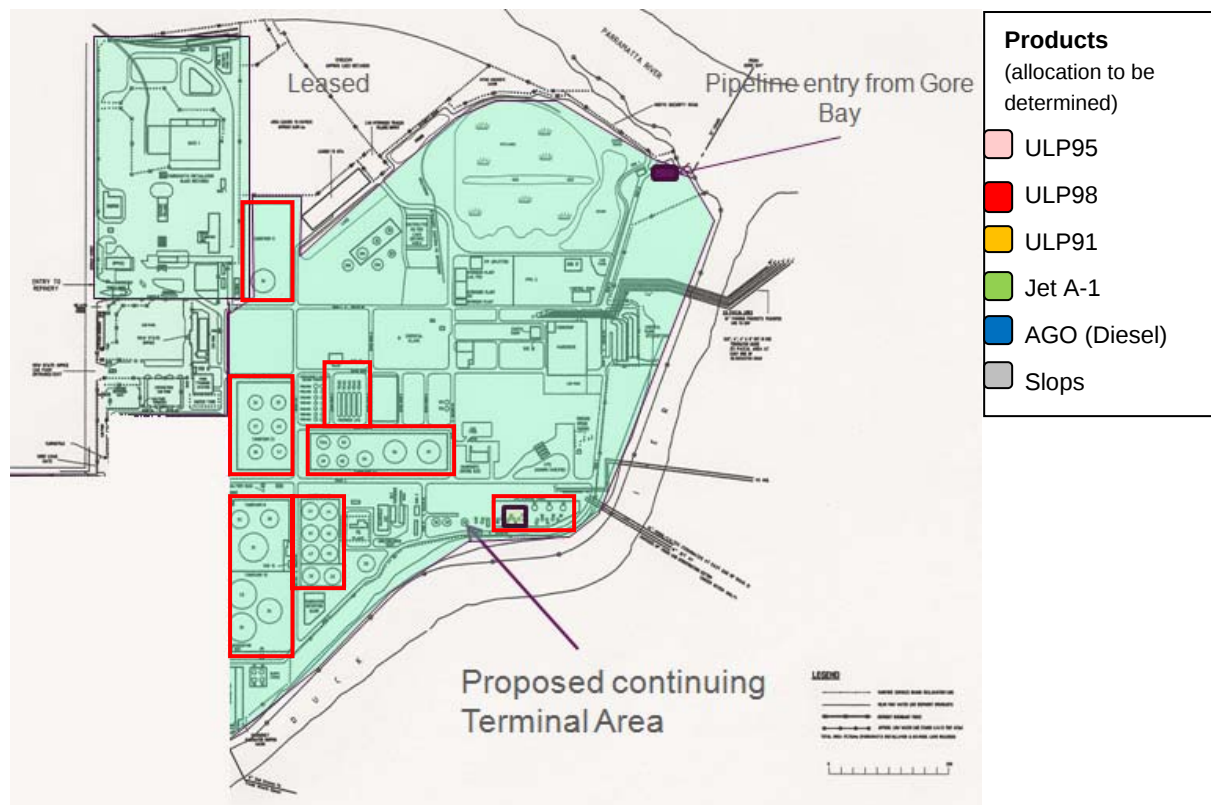


Plate 2 Proposed Tank Storage and Configuration at the Clyde Refinery

The western section of the Refinery, within which refining operations are currently conducted, is planned to have the redundant infrastructure progressively demolished as part of this development application and the 40 – 45 hectares (ha) of land cleared in preparation for potential future redevelopment (refer Plate 1). Some of the existing assets will be required to be retained in place for an, as yet, undetermined amount of time while conversion works progress and while decommissioning, demolition and removal activities are undertaken. A preferred future use for this land is still being assessed. Environmental assessments have been conducted on this land over many years and, recently, further assessments have been conducted and show only marginal contamination in confined areas. Once the assets are removed and a further environmental assessment will be conducted on the areas unable to be currently accessed due to the presence of the refining assets. To the extent that any remediation of this area is required or redevelopment is proposed, this would be the subject of a separate development application, and the findings of the further environmental assessment would be used to develop a remediation plan which would be submitted in the EIS as part of that separate development application. Control of dust and ground stabilisation during demolition/removal works will be part of the current EIS, recognising the proximity of the site to major arterial roads and the rail network.

The conversion of the refinery would maximise use of existing assets where possible and practical. Some sections of the pipework within the Clyde facility would be replaced to remove bottlenecks, increase efficiency of the site, improve safeguarding and to cater for the reallocation of products within the existing tanks. Other hardware and system changes would be undertaken to maximise the efficiency of the terminal facilities as part of the redevelopment.

The current Gore Bay – Clyde pipeline would continue to be used to transfer product from Gore Bay to Clyde and from Clyde to Gore Bay if required. Maintenance and inspection of the existing pipelines would continue using the robust integrity systems currently in use which involve a combination of non-destructive testing and visual inspections.

The Clyde Refinery currently operates under continuing use rights given that most of the development existed prior to the need to obtain development consent and prior to the enactment of the *Environmental Planning and Assessment Act 1979*, although various planning approvals for additions and upgrades to the parts of the sites have been granted over time. Recent major development approvals for the Clyde Refinery include the HDS

(Hydrodesulphurization) Unit Upgrade and FCCU (Fluidised Catalytic Cracking Unit) Reactor and Regenerator Rejuvenation projects, which were assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (now repealed).

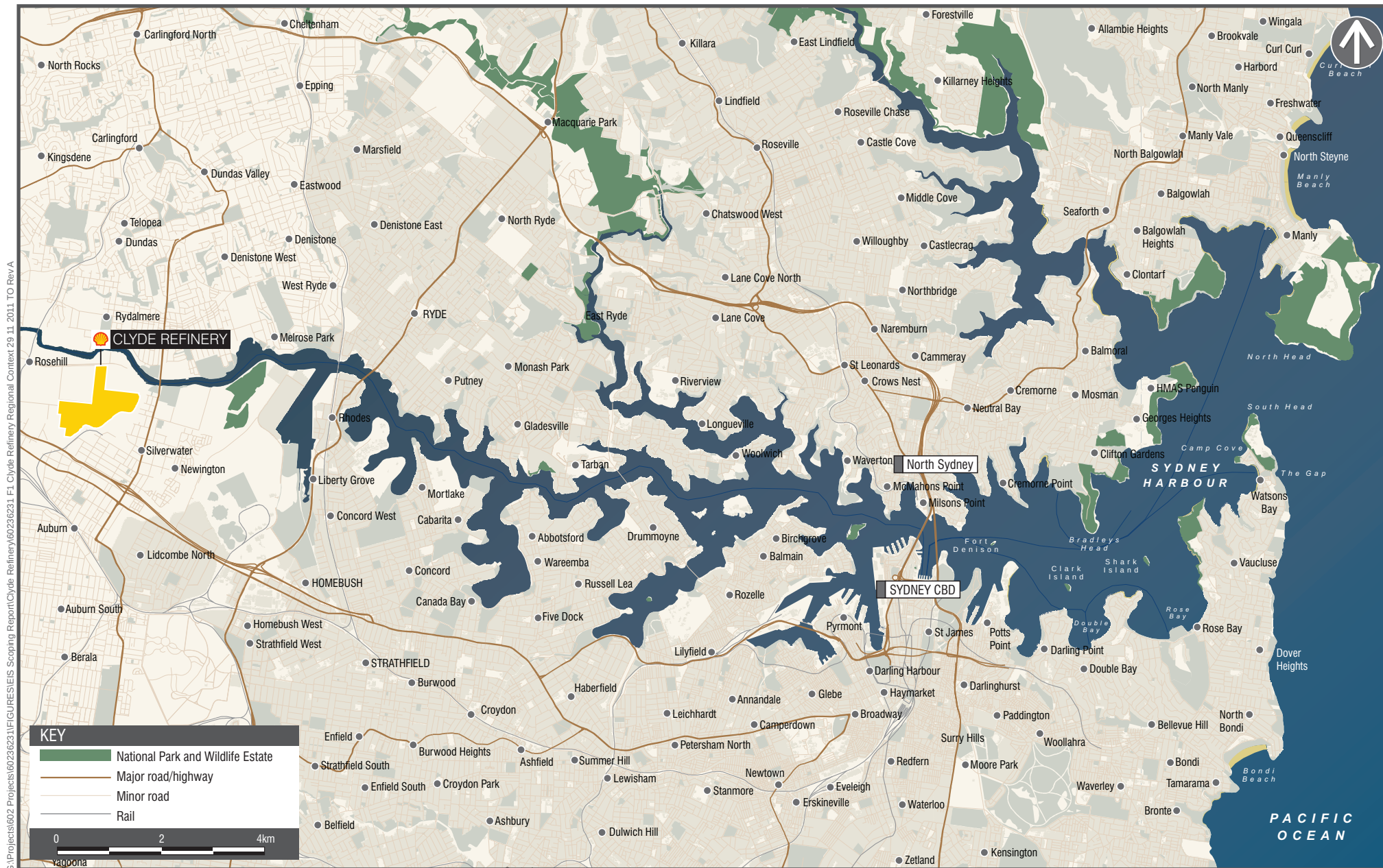
1.2 Scope and Structure of the Report

The purpose of this report is to characterise the proposed conversion of Shell's Clyde Refinery (the Project) to an import terminal and to provide an overview of its potential effects on the environment and the community.

A separate EIS Scoping Report will be prepared to consider the potential environmental impacts of each of the proposed upgrade of the Gore Bay Terminal site and the potential remediation and redevelopment of the land no longer required for ongoing operations at Clyde. The EIS Scoping Report is intended to provide the New South Wales Department of Planning & Infrastructure (DP&I) and other statutory authorities with sufficient information to establish the key environmental issues associated with the proposed project. The information contained in this report would be used by the DP&I to determine whether the Project is to be assessed as State Significant Development (SSD), and to develop the Director-General's Environmental Assessment Requirements (EARs) for the EIS.

The structure of the EIS Scoping Report is outlined below:

- Sections 1 and 2 provide an introduction to the proposed project including a description of the site and surrounding area;
- Section 3 includes a description of the proposal and its main components;
- Section 4 describes the legislation applying to the proposed project;
- Section 5 provides details of preliminary consultation undertaken or planned with regulatory authorities;
- Section 6 identifies potential environmental issues, assesses the potential environmental risks associated with the proposed project and prioritises them; and
- Sections 7, 8 and 9 discuss the potential environmental impacts of the proposal, including the existing conditions, anticipated environmental impacts and methodology for further assessment.



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2.0 Site and Surrounding Area

2.1 Study Area

The Project site is located in Rosehill in the Sydney metropolitan area; on the upper reaches of Sydney Harbour New South Wales (refer to Figure 2). Sydney Harbour caters for both commercial shipping and recreational boating activities and is characterised by a combination of port, industrial, residential and recreational land uses throughout.

The Clyde Refinery is owned and operated by Shell Refining Australia Pty Ltd. The Project area for this EIS scoping report includes the Clyde Refinery site in Rosehill.

The Shell crude oil refinery forms part of the Camellia Industrial estate and the applicant has been operating from this site since 1928, located at 9 Devon Street, Rosehill. The site is in the Parramatta Local Government Area (LGA) on Lot 1, DP 109739; 16km west of the Sydney Central Business District (CBD) (refer to Figure 1). Shell also owns three adjacent parcels of land at the site; Lot 101 DP 809348, Lot 5 DP 549358 and Lot 2 DP 224288, which they have leased to other separate companies. The site area is 94.38 hectares (ha) and is zoned as IN3 Heavy Industrial under the Parramatta Local Environmental Plan (LEP) 2011.

2.2 Surrounding Area

The area surrounding the Shell Refinery at Rosehill is comprised of industrial properties. Businesses present in close proximity to the Refinery are involved in port related activities, waste services, building products, recycling facilities, product transport and gas supplies (refer to Table 1). Rosehill Racecourse and Parramatta City Raceway are located approximately 250m north-west and 550m south-west of the refinery respectively and the closest residential areas are those of Rydalmere, 800m to the north of the site across Parramatta River and Rosehill, 1.1km to the west. Riparian vegetation borders the site and a small patch of riparian vegetation exists just outside the Shell site to the north east bordering the Parramatta River; however this area is not within the Project area.

Topographically, the Refinery site is flat due to extensive capping and filling of the site over a period spanning more than 100 years (Herbert, 1983) and is less than 10 metres AHD (Australian Height Datum) in elevation.

Table 1 Surrounding Properties and Business Activities

Property Details	Business Activities	Proximity to the Refinery Boundary
Patrick Port Services 39 Grand Avenue Lot 2 DP 539890	Rail Container Services	300m
Veolia Environmental Services 37 Grand Avenue Lot 1 DP 539890	Waste Facility	250m
EarthPower 35 Grand Avenue Lot 23 DP 874055	Recycling/energy production Facility	150m
Boral Plasterboard 3 Thackeray Street Lot 23 DP 793243	Building Products	100m
Concrete Recyclers Pty Ltd 14 Thackeray Street Lot 4 DP 856266	Recycling Facility	170m
James Hardie Building Products Devon Street Lot 102 DP 868623	Building Products	<50m
Kleenheat Gas Head Office Grand Avenue Lot 3 DP 843591	Gas Supplies	430m

Property Details	Business Activities	Proximity to the Refinery Boundary
CSR Roofing Sales and Manufacturing Head Office 10 Grand Avenue Lot 4 DP 623497	Building Products	350m
Shell Refinery Warehouse Delivery Point Grand Avenue Lot 2 DP 607036	Product Transport Facility	500m
Northline Freight Distribution 3 Shirley Street Lot 2 DP 864567	Product Transport Facility	Directly adjacent

Tenants also currently occupy areas within the Shell owned land including Jemena, Auto Nexus and Basell. These organisations will be consulted during the preparation of the EIS.

3.0 The Proposal

3.1 Summary

Shell announced in July 2011 that it would progress with the cessation of refining operations at its Clyde Refinery in Rosehill, upgrade the terminal storage at Clyde and the Gore Bay terminal storage facilities to accommodate full imports of finished products. The proposal recognises the increased competition from new mega-refineries in Asia, supply and demand realities in our region and Clyde refinery's small scale in comparison to its regional competition.

A description of the existing activities and facilities at the Gore Bay site is provided in a separate EIS Scoping Report (AECOM 2011), while current operations at the Clyde refinery are discussed in Section 3.3 below. The Gore Bay Terminal and Clyde sites are proposed to be converted into solely finished product facilities. This will allow Shell to continue to supply the domestic fuel markets and capitalise on their existing land and infrastructure.

The proposed conversion Project at the Clyde Refinery would comprise:

- Conversion of the eastern section of the Clyde Site from crude oil, intermediate product, feedstock product and finished product terminal storage to solely finished product terminal storage (storage, blending and distribution).
- Demolition of the existing refinery processing units and other redundant infrastructure at the site and sale or disposal of redundant equipment.

It is expected that the works will be carried out over an extended period and comprise a number of components.

3.2 The Proponent

Shell is now a global provider to the energy and petrochemical markets with international headquarters in The Hague, Netherlands. The Australian headquarters of the company are located in Melbourne, Victoria. Shell Australia Limited has been operating in Australia since 1901 and currently employs around 2, 500 people across the country.

In 2010, Shell reported global revenue in excess of \$368 billion. Across the business in 2010, Shell was operating in over 90 countries, employing in excess of 93,000 personnel. They operated 17 refineries globally and produced 3.3 million barrels of gas and oil daily. Shell operates approximately 43,000 service stations worldwide. In Australia, Coles Express and owner-operators operate the Shell retail service stations.

The main business activities of Shell in Australia are the upstream exploration and production of oil and gas and the downstream business which includes refining, supplying, manufacturing and marketing of a range of oil products.

Shell's operations in Sydney include:

- The Clyde Refinery which produces 40% of the NSW refined petroleum requirements;
- Parramatta road distribution Terminal - a seven-bay main fuels road gantry joint facility with British Petroleum (BP) handling an annual throughput of 2.7 billion litres. This Terminal also includes a packed lubricants warehouse and lube oil tank farm storing finished bulk lubricants;
- Retail operations, approx 210 retail sites operated by Coles Express;
- Bulk fuel supply of Jet fuel via a pipeline direct to Sydney Airport ;
- Bulk supply to Newcastle via the Hunter pipeline;
- The supply of road bitumen which is produced at the Clyde Refinery;
- The supply of marine fuel and lubricants to clients which include cruise lines, container lines, tankers and ferries; and
- The supply of bulk solvents and specialty chemicals used in the manufacture of paints, resin, adhesives, detergents, and plastics, as well as in the mining sector.

3.3 Existing Operations

The Shell Refinery was built in the early 1920's and has been operated by Shell since 1928. It is the longest operating refinery in Australia and is one of the most complex of the seven refineries which operate in Australia. The refinery receives crude oil from the Gore Bay Terminal via a 19km pipeline also owned and operated by Shell.

The current Refinery operates as a continuous production facility 24 hours per day. The Clyde refinery is one of two major refineries in NSW supplying in excess of 40% of the States petroleum products. Annually the refinery processes approximately 30 million barrels of crude oil and other feeds, from which 4.8 billion litres of petroleum products are produced and structurally imports some finished products. Major products currently produced are:

- Petrol;
- Automotive Gas Oil (Diesel);
- Jet fuel;
- Bitumen; and
- LPG (as a refining by-product).

The refinery's primary processing is carried out by a crude distillation unit. The major secondary processing unit is the catalytic cracking unit; which converts the heaviest part of crude oil into petrol, liquid petroleum gas, propylene, diesel and fuel oil blending components. The refinery also has a continuous catalytic reformer (platformer), which greatly enhances the refinery's octane capability allowing supply of the higher octane grades of petrol products, including V-Power.

Distribution to customers is via Shells Parramatta Distribution terminal which is located within the green-shaded area of the site (Plate 1). Products are distributed via road to customers in the greater metropolitan area and throughout NSW. A dedicated pipeline also connects the refinery to Sydney airport for the distribution of jet fuel. Product is also distributed via pipeline to Shell and other companies' terminals at Newcastle and Silverwater.

3.4 Proposed Development

3.4.1 Demolition Phase - Refinery

The demolition of the refinery's processing units will be undertaken over three phases which are discussed below. The baseline date for the commencement of the demolition is the cessation of processing crude feedstock as received from Gore Bay. This date is yet to be confirmed, however will be prior to mid-2013.

The demotion phase will result in substantial amount of waste materials. This will be assessed in detail during the EIS and a project specific Waste Management Plan would be developed.

Phase 1: Initial decommissioning of units.

Activities to be undertaken for Phase 1 of the demotion will involve the following activities. This is essentially works to prepare for the physical demolition of plant and equipment including:

- Shutdown of units;
- Removal of inventory from the units and gas free to the unit battery limits;
- Draining and gas freeing product run down lines from the battery limits to storage;
- Isolating and making safe electrical circuits and infrastructure not required; and
- Removing from the units Instrumentation / electrical and rotating equipment identified for sale or reuse in the wider Shell group.

It is anticipated that Phase 1 will be manned from the current refinery labour contingent of employees and contractors.

Phase 2: Ongoing decommissioning / deconstruction

Phase 2 activities undertaken involve some disconnection of services; cleaning and establishment of structures to facilitate the Phase 3 works. Specifically this would involve:

- Finalising the gas freeing and cleaning of interconnecting pipe work between units and storage tanks;
- Decommissioning and cleaning the flare system;
- Removal of catalyst, etc from the internals of columns / vessels;
- Commencement of cleaning of tanks; and
- Deconstruction of process equipment that is either identified for reuse / sale or is of such construction or size that is not suited to typical demolition techniques.

It is expected that Phase 2 resourcing profile will be comprised primarily of:

- Industrial tank cleaning contractors from the local and international market;
- Mechanical contractors, fitting / scaffolding and rigging which are to be sourced locally; and
- Minimal use of high lift cranes.

This phase of work is expected to be undertaken during daylight hours largely using contractor personnel with Shell oversight.

Phase 3: Demolition

This phase involves the majority of demolition works required. Activities specifically to be undertaken include:

- Isolation and management of identified hazardous materials such as asbestos;
- Typical demolition techniques of collapsing structure to a level that allows the use of heavy machinery to cut the process equipment and piping for scrap recovery;
- Limited use of explosive techniques;
- Civil works to remove foundations; and
- Remediation of drainage and ground water management.

This phase of work is expected to be undertaken during daylight hours largely using contractor personnel with Shell oversight.

3.4.2 Re- Configuration and Operational Phase

Activities to be undertaken for prior to demotion will involve works to prepare for the reconfiguration of the storage facilities in the eastern section of the current refinery site in preparation for creating an efficient terminal operation including:

- Cleaning, refurbishment and re-allocation of tanks in the terminal area of the site;
- Continuing use of some assets within the western area of the site;
- Upgrades product movement and operational control systems to improve site efficiency;
- Inlet manifold modifications, product distribution pipe work and installation of additional product quality controls;
- Revised pumping systems and controls;
- Upgraded electrical systems to accommodate the new terminal operations;
- Site drainage and water treatment to reflect the smaller footprint;
- Upgraded safeguarding systems; and
- Demolition and removal of redundant equipment no longer usable within the terminal operations.

These works will commence in preparation of receiving imported finished product and will be conducted in stages only to be completed after demolition is completed. There will be a reduction of approximately 50% in the number of tanks required for finished product imports and terminal operations when compared to the current situation.

Provided in Table 2 is a breakdown of product storage allocation.

Table 2 Tank Storage per Product

Product	Storage Amount
U 95	13%
U 98	12%
U 91	25%
Jet A1	24%
AGO	25%
Slops	1%

3.4.3 Infrastructure

Following is an indication of the likely infrastructure and resources required to undertake the proposed works and the subsequent implications for resourcing and infrastructure provision.

3.4.4 Electricity

Existing electricity infrastructure will continue to be used with reduced electricity consumption.

3.4.5 Electrical/Instrumentation facilities

Instrumentation at the Clyde will be upgraded. This would include:

- Upgrades to tank instrumentation and tank control systems to enable remote and automated control;
- Inlet manifold systems and remote valves with segregated product distribution piping to respective tanks;
- Revised pumping and gantry supply piping systems;
- Revised site electrical systems;
- Changes to fire protection and suppression systems; and
- Safety shutdown systems.

3.4.6 Water

The current refinery operations consume approximately 1,200 tonnes of potable and recycled water per day of which 90-95% of this demand would be eliminated following the shutdown of the refinery operations. Another 150 tonnes of potable water per day is consumed for amenities. The terminal demand is expected to reduce the potable water consumption by approximately 75%.

Drainage in the eastern section of the site is being reviewed to determine how clean stormwater under terminal operations can be diverted away from interceptors direct to river to help improve the effectiveness of the interceptors. Drainage in the western section of the site will be modified after completion of demolition to meet the needs of the vacant site and will be further modified subject to the potential remediation and redevelopment of this land (subject to a separate development application).

3.4.7 Sewer

Existing sewerage infrastructure will continue to be used however; a more detailed investigation into this would be undertaken during the preparation of the EIS. It is expected that the amount of sewerage generated will decrease significantly.

3.4.8 Natural gas

Natural gas is currently used by the refinery as a partial power source with electricity and self-manufactured gases and steam. Natural gas demand will reduce significantly following the shutdown of the refinery operations with small amounts still being required for boiler operation and supply to Basell.

3.4.9 Electricity

Existing electricity usage will also reduce significantly following the shutdown of the refinery operations. Electricity will still be required for operation of the terminal assets, Basell and general amenities. A detailed investigation of this will be undertaken during the EIS.

3.4.10 Gore Bay - Clyde Pipeline

The Clyde Refinery and Gore Bay Terminal are connected by a 19km pipeline, which measures 300 millimetres (mm) in diameter. Shell is not intending to build any additional pipelines or change the use of this pipeline as part of this Project. The new terminal operation at Clyde will rely on continued use of the existing pipeline between the Gore Bay Terminal and Clyde Refinery to transport finished product from the Gore Bay Terminal to tankage at Clyde.

3.4.11 Road Access

The road transport infrastructure providing access to the Rosehill/Camellia industrial precinct is well established and adequate to service the construction and heavy industry activities associated with the conversion of the refinery to a terminal. Traffic associated with the Project is expected to use local industrial roads including Grand Avenue, Durham Street and Devon Street, with Grand Avenue connecting to James Ruse Drive and Durham Street, Unwin Street, Kay Street and Wentworth Streets to Parramatta Road. Both provide connection to the M4 and Victoria Road; both part of the regional arterial road network.

There is no immediate change expected in the road traffic generated by the distribution of petroleum products by road to customers. This road traffic may increase over time as a result of market growth unless vehicle changes offset the traffic movement growth.

3.4.12 Workforce

The current workforce on site between Clyde and Gore Bay Terminal is approximately 310 employees and 200 contractors. With the removal of the refining operation and high automation of the Terminal, the number of employees would decrease.

The final operational workforce is currently being determined; however it is anticipated between 30 – 50 employees, which would operate in a shift arrangement over 24 hours per day 7 days per week.

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4.0 Planning Considerations

4.1 Overview

This section identifies the legislative requirements and planning controls relevant to the Project and outlines the key policy and statutory considerations that would be addressed in more detail in the EIS.

The Project would be undertaken in accordance with the requirements of relevant environmental and planning legislation. All associated environmental and planning approvals would be obtained as required for a State Significant Development (SSD) under Part 4 of the EP&A Act, including but not limited to:

- Commonwealth and State Government planning approvals;
- Local government development approvals;
- Operational approvals (such as an Environment Protection Licence); and
- Other potential approvals required under relevant environmental and planning legislation and regulations.

4.2 Commonwealth Legislative Requirements

4.2.1 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the approval of the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities (SEWPAC) for actions that would have, or are likely to have, a significant impact on matters of National Environmental Significant (NES). The EPBC Act lists seven matters of NES which must be addressed when assessing the impacts of a proposal, which are:

- World Heritage properties;
- National Heritage places;
- Wetlands of International Importance;
- Listed threatened species and ecological communities;
- Migratory species protected under international agreements;
- Commonwealth Marine Areas; and
- Nuclear actions.

If potential significant impacts on a matter of NES are identified, then a referral to the Minister would be made in accordance with the requirements of the EPBC Act for a determination as to whether the Project is a Controlled action. There are no RAMSAR wetlands located close to the site. A search of the EPBC *Protected Matters Search Tool* identified two world and national heritage properties, three threatened ecological communities, 23 threatened species and 32 migratory species within 5km of the refinery.

There are also known populations of the Green and Golden Bell Frog (GGBF) near the Clyde Refinery site however no populations have ever been located on the current refinery land.

The potential impacts on the identified matters of NES as a result of the proposal are discussed in Section 6.0, and would need to be assessed in further detail during the preparation of the EIS, where required. The assessment of the proposed Project's impacts on matters of NES and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of NES. Accordingly, it is anticipated that the Project would not need to be referred to the SEWPAC.

4.2.2 National Greenhouse and Energy Reporting Act 2007 (NGER Act)

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) came into effect in September 2007 and introduced a single national reporting framework for the reporting and dissemination of information about greenhouse gas emissions, greenhouse gas projects and energy use and production by corporations. The NGER Act makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds. Shell would continue to report emissions from the terminal

operations which would be significantly lower than those reported for the joint refinery and terminal operations currently.

4.3 NSW Legislative Requirements

4.3.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) provide the framework for environmental planning in NSW and include provisions to ensure that proposals that have the potential to impact on the environment are subject to detailed assessment and provide opportunity for public involvement.

In NSW, development that is of State significance is assessed under the State significant assessment system which provides separate assessment pathways for State significant development (SSD) and State significant infrastructure (SSI). Development may be declared to be SSD under Part 4 Section 89C of the EP&A Act and the State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP).

The Clyde Refinery currently operates under "continuing use" rights in accordance with Section 109 of the EP&A Act. The conversion of the Clyde refinery to an import terminal will constitute SSD within the definition of the State Environmental Planning Policy (State and Regional Development) 2011, Clause 8(1)(b) and Schedule 1 Clause 10(3). The site is currently a Major Hazard Facility (MHF) under the OH&S Act by reason of its manufacture, storage and use of dangerous goods and would continue to be classified as an MHF following its conversion to a terminal by reason of its continuing storage and use of dangerous goods. In addition, the conversion will also satisfy the criteria set out in Clause 10(2)(a) as development for the purposes of a liquid fuel depot with a capital investment value of more than \$30m. However, the fact that the site would continue to be an MHF is the primary reason for the project being considered to be SSD.

4.3.2 Contaminated Land Management Act 1997 (CLM Act)

The primary objective of the *Contaminated Land Management Act 1997* (CLM Act) is to establish a process for investigating and remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment. Where land is identified as potentially contaminated, consultation with the NSW Office of Environment and Heritage (OEH) should be undertaken.

The Clyde Refinery Site is not currently regulated under the CLM Act. The Clyde refinery site has been subjected to detailed environmental assessments undertaken by ERM and recently reviewed by an EPA accredited site auditor. There is an Environmental Management Plan in place to manage any existing contamination of soil and groundwater and details of this management strategy and the ongoing environmental management of the site will be detailed in the EIS. Shell will undertake further environmental assessments during the Project as further land becomes accessible within the current processing area to better understand the extent and characterisation of any contamination. The management of any additional contamination is expected to be included in the current Environmental Management Plan covering the site and will then be used to formulate the environmental requirements relating to any future remediation and/or redevelopment of this area (which would be subject to a separate development application process and EIS).

Shell is currently in dialogue with the Office of Environment and Heritage (OEH) on a range of topics associated with the Project, including environmental testing and remediation, and environmental operating standards for the new terminal operation at Clyde. If the site or parts of it require regulation under the *Contaminated Land Management Act 1997* in future, this would not affect the underlying statutory environmental impact assessment process for the proposed conversion of the refinery to a terminal, but may act as an additional trigger for SSD for any future development application dealing with the redevelopment of the land that is not required for the terminal operation.

4.3.3 Environmentally Hazardous Chemicals Act 1985

The *Environmentally Hazardous Chemicals Act 1985* regulates chemical wastes in NSW. Under the Act, Chemical Control Orders (CCO) can be declared for specific wastes types. They are the primary regulatory tool to control particular chemicals and/or chemical wastes that have a significant potential or actual impact on the environment. CCOs can set controls on activities throughout the chemical's lifecycle through general requirements and by requiring that certain activities be subject to particular licence conditions.

OEH currently has five CCOs in place in NSW, which includes Polychlorinated Biphenyl (PCB) wastes. Condition L7 of Shells EPL 570 notes that the licensee must comply with the CCO in relation to material wastes containing

PCBs. This CCO outlines controls on the generation, processing, storage, conveying and disposal of PCB materials or wastes (depending on the concentration of PCB).

Any wastes generated as part of the demolition and waste product will require to be managed in accordance with the Act and EPL 570.

4.3.4 Protection of Environmental Operations Act 1997 (POEO Act)

Under the *Protection of the Environment Operations Act 1997* (POEO Act), it is an offence to cause water, air or noise pollution without authorisation for such under an Environment Protection Licence (EPL). Additionally, Schedule 1 of the POEO Act identifies "scheduled activities" which are required to be licensed by the OEH.

The Clyde Refinery is currently operating under EPL 570. This licence may either be amended, or revoked and replaced, to reflect the altered operations of the site for the purpose of a fuel terminal.

4.3.5 Threatened Species Conservation Act 1995 (TSC Act)

The *Threatened Species Conservation Act 1995* (TSC Act) identifies and protects threatened native plants and animals and provides for species recovery and threat abatement programs. The objectives of the Act are to conserve biological diversity and promote sustainable development, prevent the extinction of native plants and animals, protect habitat that is critical to the survival of endangered species, eliminate or manage threats to biodiversity, properly assess the impact of development on threatened species and to encourage co-operative management in the conservation of threatened species. These objectives are achieved through:

- Listing of threatened species, populations and communities;
- Requiring recovery and threat abatement actions to be undertaken where threatened species are impacted; and
- Providing a vehicle to improve degraded environments, and to protect areas of high conservation value to threatened species.

It is anticipated that impact on threatened species will be low due to the fact the works program will be confined to a reduced footprint on the existing site and the project will involve upgrading an existing terminal facility rather than introducing a new or different operations.

4.3.6 Work Health and Safety Act (2011) (WHS Act) and Regulation (2011) (WHSR)

The Clyde Refinery is currently classified as a Major Hazard Facility (MHF) under the Work Health and Safety Regulation 2011, and therefore WorkCover NSW requires notification of the proposal. MHFs are industrial sites such as oil refineries, chemical processing plants and large LP gas depots that store, handle or process specific hazardous materials in quantities above threshold limits as defined in Schedule 8.

Chapter 6B of the Regulation applies to MHFs and the objective of this Chapter is to put in place measures aimed at preventing major accidents occurring at MHFs, and protecting the health and safety of people at work and the public from hazards leading to or arising from major accidents. Chapter 6B of the Regulation required operators of MHFs to minimise the likelihood and consequences from a major accident by having in place a range of additional safety controls such as:

- Hazard identification and risk assessment;
- Safety management system;
- Emergency plans and security plans; and
- Preparation and submission of a safety report.

The National Standard for the Control of Major Hazard Facilities [NOHSC: 1014(2002)] (MHF National Standard) provides the framework to achieve a harmonised approach for safety controls at a MHF.

The need for specific legislation for the control of MHFs in Australia was highlighted by a number of major incidents including the Seven Hills chemical plant fire in NSW (1989), the LP gas fire and BLEVE at St. Peters in NSW (1990), the Coode Island fire in Victoria (1991) and the Longford gas plant explosion in Victoria (1998).

Shell is in the process of submitting a new Safety Report to WorkCover for a new MHF Licence which takes into account the learnings from these incidents and global experiences with facilities such as Buncefield (UK) terminal incident. Shell's new Safety Report will be submitted to WorkCover by February 2012.

4.3.7 Heritage Act 1977

The *Heritage Act 1977* aims to protect and conserve non-Aboriginal cultural heritage, including scheduled heritage items, sites and relics. The *Heritage Act* is administered by the Heritage Council of NSW.

The *Heritage Act* makes provision for a place, building, work, relic, moveable object, precinct, or land to be listed on the State Heritage Register. If an item is the subject of an interim listing, or is listed on the State Heritage Register, a person must obtain approval under section 60 of the *Heritage Act* for works or activities that may impact on these items.

Shell's refinery wharf are heritage listed under the LEP 2011, as are the wetlands, industrial developments, tram alignment, Racecourse and proposed township which lie immediately next to the Project Site. A desktop search of the NSW State heritage Register and the Parramatta LEP 2011 identified 19 heritage listed sites within 500m of the Project (refer to Table 4), none of which are of Aboriginal significance.

4.3.8 Water Management Act 2000

The *Water Management Act 2000* provides the legislative basis for water use, management and planning. It is gradually replacing the planning and management frameworks in the *Water Act 1912*.

The Act provides for a range of water transactions known as access licence dealings or dealings and the Act also stipulates that a controlled activity approval may be required under the *Water Management Act 2000* if works are to be undertaken within 40 metres of a water body/ watercourse. Should the planned works at the Clyde site be conducted within 40 metres of the current watercourses on the site boundaries, a controlled activity approval will be sought.

4.4 State Environmental Planning Policies

4.4.1 State Environmental Planning Policy No.33 – Hazardous and Offensive Development

The *State Environmental Planning Policy No.33 – Hazardous and Offensive Development* (SEPP 33) aims to amend the definitions of hazardous and offensive development where used in environmental planning instruments, to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account and to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise the adverse impact (clause 2).

Clause 3 describes "potentially hazardous industry" as:

"development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

- 1) *to human health, life or property, or*
- 2) *to the biophysical environment,*

and includes a hazardous industry and a hazardous storage establishment."

Clause (4)1 defines a "hazardous industry" as:

"a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would pose a significant risk in relation to the locality:

- a) *to human health, life or property, or*
- b) *to the biophysical environment."*

A "hazardous storage establishment" is defined as:

"any establishment where goods, materials or products are stored which, when in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example,

measures to isolate the establishment from existing or likely future development on the other land in the locality), would pose a significant risk in relation to the locality:

- a) To human health, life or property, or
- b) To the biophysical environment.”

The change in products stored at Clyde and the cessation of refining will reduce the current hazard profile of Clyde. The Site, however, will still remain classified as a Major Hazard Facility and a Preliminary Hazard Analysis will still be required as part of the development application to show the changes to the risk profile of the site. This will be a component of the EIS. As noted at 4.5.4 below, development for the purposes of a "hazardous industry" or a "hazardous storage establishment" are permissible with consent under the Parramatta Local Environmental Plan 2011.

4.4.2 State Environmental Planning Policy (State and Regional Development) 2011

The *State Environmental Planning Policy (State and Regional Development) 2011* aims to identify development that is State Significant Development (SSD) and State significant infrastructure. Projects which are declared in either of these categories are to be assessed by the Department of Planning and Infrastructure or may be referred to the Planning and Assessment Commission.

Clause 8 stipulates that development is declared to be State significant development for the purposes of the Act if development on the land is not permissible without development consent under Part 4 of the Act and if the development is specified in Schedule 1 or 2.

Under *State Environmental Planning Policy (State and Regional Development) 2011*, Schedule 1 Clause 10 (3) identifies development for the purpose of the manufacture, storage or use of dangerous goods in such quantities that constitute the development as a major hazard facility under the *Control of Major Hazard Facilities National Standard* may be declared a SSD. The site is currently classified as an MHF, which will remain unchanged upon the conversion to a finished products terminal and therefore meets the criteria of an SSD.

As an SSD, the proposed development of the finished product terminal and associated activities at the Clyde Refinery site is to be assessed under Division 4.1, Part 4 of the EP&A Act (SSD), and is likely to be determined by the Minister for Planning.

4.4.3 State Environmental Planning Policy No. 55 – Remediation of Land

In practice, *State Environmental Planning Policy No. 55 – Remediation of Land* makes all remediation works in New South Wales either permissible with development consent (Category 1 remediation works) or permissible without development consent (Category 2 remediation works). In broad terms, Category 1 works include those remediation activities with a greater scale, intensity and potential for environmental impacts, while Category 2 works are relatively more benign (SEPP 55 provides a more comprehensive list of activities that fall within each category).

State Environmental Planning Policy No. 55 – Remediation of Land requires the consent authority to consider whether land is contaminated as part of the assessment of a development application, and if it is, whether it is suitable or could be made suitable through remediation, for the intended land use. Given that the eastern section of the Clyde Site intended to be used for ongoing terminal operations, it is proposed that any existing contamination on this portion of the sites is continued to be managed via an the existing Environmental Management Plan that is currently in operation for the site. If the western portion of the Clyde Site (subject to demolition works) is considered for development in the future, potential contamination in that part of the site would need to be assessed in the context of intended future land use (whether continuing as a heavy industrial use, or some other land use type). It is proposed that further environmental investigation will be conducted of areas within this site that cannot currently be accessed once the equipment and assets are removed to further understand that extent and characterisation of the contamination. This information would be taken into account in any future development application and EIS required for any proposed remediation and/or redevelopment of this land.

4.5 Other Strategic Policy Developments

4.5.1 State Plan: A New Direction for NSW

The revised *NSW State Plan: A New Direction for NSW* (NSW State Plan) released in March 2010, sets out priorities for Government action over a ten year time span. The *NSW State Plan* includes 10 additional priorities and 20 additional targets, designed to deliver better services and improve accountability across the public sector.

Chapter 2 of the *NSW State Plan* deals with supporting business and jobs and is aimed at increased business investment and support jobs as well as speeding up planning decisions. The *NSW State Plan* aims to double new business from around \$40 billion per year in 2006 to around \$80 billion per year by 2016 and to support jobs during the economic downturn. The *NSW State Plan* also refers to meeting planning benchmarks for timely processing of major project determinations and planning proposals.

4.5.2 Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* (REP 2005) seeks to ensure that the catchment, foreshores, waterways and islands of Sydney Harbour are recognised, protected, enhanced and maintained: as an outstanding natural asset, a public asset of national and heritage significance and for existing and future generations. It also aims to ensure a healthy, sustainable environment on land and water and to achieve a high quality and ecologically sustainable urban environment.

The Clyde Refinery and Parramatta Terminal are located on land adjacent to waters zoned as W1 Maritime Waters and E2 Environmental Protection under the REP 2005. Objectives of the zone include:

W1 Maritime Waters

- a) *to give preference to and protect waters required for the effective and efficient movement of commercial shipping, public water transport and maritime industrial operations generally,*
- b) *to allow development only where it is demonstrated that it is compatible with, and will not adversely affect the effective and efficient movement of, commercial shipping, public water transport and maritime industry operations,*
- c) *to promote equitable use of the waterway, including use by passive recreation craft.*

W2 Environmental Protection

- a) *to protect the natural and cultural values of waters in this zone,*
- b) *to prevent damage or the possibility of longer term detrimental impacts to the natural and cultural values of waters in this zone and adjoining foreshores,*
- c) *to give preference to enhancing and rehabilitating the natural and cultural values of waters in this zone and adjoining foreshores,*
- d) *to provide for the long-term management of the natural and cultural values of waters in this zone and adjoining foreshores.*

The proposed works would therefore not alter the effectiveness and efficiency of commercial shipping movements, public water transport and maritime industrial operations in the harbour. The proposed works would not promote unequal use of the waters in the Harbour, and it would be compatible with commercial shipping, public water transport and maritime industry operations. The proposed works is also compatible with the objectives of the E2 Environmental Protection zone as the Project would not detrimentally affect the natural and cultural values of ware in this zone. As a result, the development would align with the zoning objectives under the REP 2005.

4.5.3 Sydney Regional Environmental Plan No. 28- Parramatta

The *Sydney Regional Environmental Plan No. 28 – Parramatta* was established to provide strategic planning for the Parramatta Primary Centre, and to recognise the unique and varied nature of each Precinct identified in the Plan. The Plan identifies eight precincts within the Parramatta area, one of which includes the area of Camellia.

Precinct 6 Camellia seeks to preserve the industrial hub of the area whilst protecting ecological values that exist with the precinct. The refinery and terminal site is located within *Regional Enterprise Zoning*, the objectives of which are to:

- a) *to achieve a prosperous and efficient regional eco-industrial estate that continues to capitalise on Camellia's strategic location and accessibility,*
- b) *to allow a wide range of industrial and heavy industrial uses in Camellia serving the Greater Metropolitan Area of Sydney and beyond,*

- c) *to ensure that development is carried out in a manner that does not detract from the amenity enjoyed by residents in neighbouring localities, the conservation of identified views, the commercial viability of the Parramatta City Centre or the efficient operation of the road system,*
- d) *to ensure that development applies current environmental management best practice,*
- e) *to maintain long-term opportunities for the future investment in development of Camellia as an eco-industrial precinct,*
- f) *to ensure that the scale, design and materials of construction, and the nature of development, contribute positively to the visual quality of the locality,*
- g) *to allow for and improve public access along the waterways, where natural values will not be diminished,*
- h) *in the case of contaminated land that is currently not suitable for public access, to ensure that opportunities are not lost for future potential foreshore access,*
- i) *to comply with the controls for Special Areas as set out in this Part.*

The Project fulfils these objectives by maintaining the site use as heavy industrial, however will result in an improvement in ecological values and amenity through the cessation of the refining operations and removal of the associated assets and products.

4.5.4 Parramatta Local Environmental Plan 2011 and Parramatta Development Control Plan (DCP)

The *Parramatta Local Environmental Plan 2011 (LEP)* aims to foster environmental, economic, social and physical wellbeing so that Parramatta develops as an integrated, balanced and sustainable city, identify, conserve and promote Parramatta's natural and cultural heritage as the framework for its identity, prosperity, liveability and social development and ensure development occurs in a manner that protects, conserves and enhances natural resources, including waterways, riparian land, surface and groundwater quality and flows and dependant ecosystems (Clause 1.2).

The Parramatta Development Control Plan (DCP) was adopted on the 12 October 2011 to supplement the Parramatta LEP 2011 and provide more detailed provisions to guide development. If there is any inconsistency between the DCP and the LEP, the LEP will prevail to the extent of the inconsistency.

The Clyde Site is located on land that is zoned "IN3 – Heavy Industrial" under the LEP. Within this zone, development for the purposes of general industries, heavy industries, hazardous storage establishments (including liquid fuel depots), *inter alia*, are permissible with development consent.

As the proposed fuel terminal would fall into one or more of these categories of development, it is therefore, permissible with development consent on land within the Clyde Site.

It is also relevant to note that Clause 2.7 of the LEP also requires development consent to be obtained for demolition activities that would be undertaken on the Clyde Site.

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5.0 Project Consultation

In order to undertake a comprehensive Environmental Assessment of the proposed Project, clear and effective consultation with the community and Government agencies is required. Consultation would be undertaken to identify relevant environmental issues and potential impacts of the Project as well as to determine the key concerns held by regulators and the community.

The key objectives of the consultation would be to:

- Initiate and maintain open communication;
- Provide an understanding of the regulatory approval process to stakeholders;
- Seek local information and input into the Project by providing a range of opportunities for stakeholders to identify key issues for consideration; and
- Proactively work with the community to propose strategies to maximise benefits and minimise any negative impacts of the Project.

There is an established Clyde Community Advisory Panel which engages with Parramatta and Auburn Councils as well as not-for-profit organisations such as University of Western Sydney and Parramatta Missions. These organisations have been made aware of the project and will be kept apprised of the process throughout the project.

Consultation with relevant government agencies and non government stakeholders is to be undertaken during preparation of the EIS and for the duration of the proposed conversion of the Clyde Refinery to a terminal. Key stakeholders that would be consulted include:

- Department of Planning and Infrastructure;
- Office of Environment and Heritage (OEH);
- Department of Industry and Investment;
- Department of Resources and Energy;
- Sydney Ports Corporation;
- WorkCover NSW;
- Sydney Water;
- Ausgrid;
- Parramatta Local Council; and
- Department of Transport (Roads and Maritime Service).

Shell is committed to engaging with all relevant stakeholders to ensure that the potential impacts identified for the Project are understood and documented and where possible avoided or minimised. To achieve this, Shell undertakes consultation with the aim to provide stakeholders with an opportunity to express their views and concerns and provide feedback.

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6.0 Key Environmental Issues

This Section describes available background information and the potential environmental impacts of the proposed Project relating to the key issues identified in the risk assessment in Section 8.0. The methods of assessment that would be used in undertaking technical studies to support the EIS are also presented.

6.1 Social and Economic Effects

6.1.1 Existing Environment

The Clyde Refinery is situated within the Parramatta Local Government Area (LGA) where almost two-thirds of jobs are in the major business hubs of Parramatta CBD, Westmead and the industrial estates of Camellia, Rydalmere and Rosehill. Close to 900,000 people were employed in the area in 2006 with over one-third of people employed in the Parramatta LGA categorised as 'highly skilled' by the Australian Bureau of Statistics. The Parramatta LGA accounts for 6% of Sydney's economy and has experienced significant growth in high value-add sectors, driving Parramatta's status as a 'Smart City' and one of the most productive economies in NSW (Parramatta City Council, 2006).

The areas surrounding the Clyde Refinery are predominantly heavy industry and well served by supporting road, rail and port infrastructure. A range of community infrastructure and services are available in the Parramatta LGA to support residents and workers including educational facilities, health services, sport/leisure and recreation facilities and aged care support services.

6.1.2 Issues for Consideration

It is expected that once the terminal is operating fully, there will be between 30-50 employees across the Gore bay and Clyde sites. The proposed conversion will result in reduced employment opportunities to work for Shell in Sydney. Employment at the refinery is concentrated mostly around activities associated with the refining and processing units on site, which will be decommissioned as part of the proposed works. There will also be a reduction in contract labour as most of this effort is expended in the processing areas.

Improvements in local air quality and visual amenity are anticipated with the cessation of refining operations and removal of associated infrastructure which may be viewed as beneficial to the residential areas of nearby Parramatta and the greater Sydney metropolitan areas.

Following the conversion and demolition of the refinery processing areas will see a significant reduction in the consumption of services for the Clyde site. The terminal will require electricity, water and gas equivalents to other terminals to maintain fire protection, operational activities and staff accommodation. It is anticipated that the vast majority of the construction and future operational workforce would reside in the Sydney Metropolitan area.

The project also involves a substantial investment in the broader NSW economy with an estimated current Project cost in excess of \$100 million. The conversion would result in a finished product facility to continue to supply the domestic fuel markets and capitalise on existing land and infrastructure.

6.1.3 Method of Assessment

As part of the preparation of the EIS a socio-economic impacts will be assessed. The assessment would identify the socio-economic profile of the Parramatta LGA as well as the wider Sydney Metropolitan region in terms of its residents, workforce and industrial and tourism base.

The assessment would also identify all positive and negative social and environmental impacts associated with the project and, where appropriate, measures would be recommended to minimise any potential negative impacts.

6.2 Air Quality and Odour

6.2.1 Existing Environment

The air quality in the area surrounding the Clyde Refinery site is impacted by emissions from industry and by traffic emissions from heavy vehicles and cars using the local and regional road network.

6.2.2 Issues for Consideration

There is potential for air quality impact during the demolition and conversion at the site. These impacts would be localised to the vicinity of works and may include emissions from construction machinery and vehicles, and fugitive dust generation and odours, particularly where earthworks and demolition is involved. Impacts can be

mitigated through use of dust suppression techniques (e.g. water sprays to exposed areas, covers on truck loads, use of wheel washes) and through use of well maintained machinery.

Atmospheric emissions from the Refinery's operation, and thus significantly reduced with its closure include:

- Carbon dioxide (CO₂);
- Carbon monoxide (CO);
- Nitrogen oxides (NO_x);
- Sulphur dioxide (SO₂);
- Volatile organic compounds (VOCs);
- Heavy metals;
- Benzo(a)Pyrene; and
- Particulates and dust.

These emissions emanate from process areas within the Refinery such as the CCU stack, gas fired heaters, storage tanks, sludge treatment, pipelines, truck and private vehicle transport. Nitrogen oxides (NO_x) and Carbon dioxide (CO₂) would likely be the principal emissions from the operating Refinery.

For Clyde there are annual stack emission reports and a TANKS model is run to determine annual emissions from tanks. LDAR program to determine fugitive emissions and Water 9 model is run to determine emissions from wastewater treatment activities. There was an AUSPLUME model run for the FCCU EA and SO₂ monitoring was conducted at the Clyde boundary to determine the actual change in air quality after installation of the new FCCU.

The proposed demolition of the Clyde Refinery and conversion to a finished product terminal will significantly reduce and potentially eliminate air emissions from the Site which currently require regular monitoring in accordance with EPL 570. It is predicted that air emissions may be reduced by more than 95%, as such an amendment to EPL 570 is likely to be required.

6.2.3 Method of Assessment

A detailed air quality assessment would be prepared as part of the EIS, prepared in accordance with relevant guideline documents including the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DECCW 2005).

The assessment would address potential air quality impacts during the proposed conversion, taking into account both prevailing and worst case atmospheric conditions and the location of sensitive receptors in the areas surrounding the site. The assessment would recommend both design and management measures to mitigate any potential impacts that are identified, however will demonstrate the significant improvement in air emissions associated with the Project.

Potential scope 1, 2 and 3 greenhouse gas emissions from the project would be calculated and an assessment would be made of the potential emissions on the environment (National Greenhouse Accounts Factors DECC 2008). Reasonable and feasible measures would be recommended to reduce these emissions where possible.

6.3 Noise and Vibration

The Clyde/Parramatta terminal will continue to be located on the existing industrial site at Rosehill. Existing background noise from the refinery is typical of a heavy industrial site and current operational facilities surrounding the site include: waste services, building products, recycling facilities, product transport and gas supplies (refer to Table 1). Noise from the site will reduce significantly with conversion to terminal operations. There is also noise generated by road movements located to the west and south of the site and along the major arterials of James Ruse Drive and the M4 motorway.

The nearest residential areas to the refinery site are to the west at Rosehill and to the north east at Rydalmere and Ermington on the other side of the Parramatta River. Other residential areas are located to the south and south west at Silverwater and Granville on the other side of the Western Motorway (M4).

6.3.1 Issues for Consideration

There are no noise limits at Clyde as per EPL condition L6. A noise assessment was undertaken for the FCCU EA. Construction noise would be characterised by demolition and site preparation activities (land clearing and

earthworks). Noise would also be generated from the transportation of materials and equipment associated with these activities.

During demolition and construction, the Project would predominantly generate noise from associated plant and equipment such as excavators, breakers, trucks and material processing devices. This work is expected to be performed during normal construction site work hours.

6.3.2 Method of Assessment

An assessment of noise and vibration for the proposed Project would be undertaken and the methodology proposed for the assessment would include:

- Determine existing background noise levels;
- Determine sound power levels of all acoustically significant plant and equipment to be operated during demolition and conversion works;
- Analyse noise data with reference to local weather conditions and cumulative impacts;
- Impact assessment (modelling) of construction/demolition and operational noise and vibration, including consideration of cumulative impacts, sleep disturbance impacts and traffic noise at identified nearest sensitive receivers, for day, evening and night time periods under calm and prevailing meteorological conditions;
- Identify noise management strategies and mitigation measures, as required; and
- Identify any residual environmental risk.

The assessment would be undertaken in accordance with government policy and guidance, including:

- the *Interim Construction Noise Guidelines* (DECC, 2009);
- the *NSW Industrial Noise Policy* (EPA, 2000); and
- the *Environmental Criteria for Road Traffic Noise* (EPA, 1999).

Management controls would be recommended to minimise potential noise impacts potentially in consultation with any nearby affected receivers. Where required, noise attenuation would be incorporated into the design of major noise sources within the Site.

6.4 Soil and Groundwater

6.4.1 Existing Environment

6.4.1.1 Soil

There have been numerous studies assessing the environmental condition at the existing Clyde Refinery and Parramatta Terminal Sites, with investigations between 1992 and 2011 detailed in Appendix A. Previous investigations (CMJA, 2004) have identified four geological units across the refinery site, which are detailed in Appendix A. Provided in Table 3 is a summary of substrate across the Clyde site.

Table 3 Soil Landscapes and characteristics in the Project Area (Soil Landscapes of the Sydney 1:100 000 Sheet).

Unit	Landscape Type	Soil Type	Limitations
Disturbed Terrain (XX)	Disturbed	Turfed fill areas commonly capped with up to 40cm of sandy loam or up to 60cm of compacted clay over fill or waste materials.	Dependent on the nature of the material. Mass movement hazard, unconsolidated low wet-strength materials, impermeable soil, poor drainage, localised very low fertility and toxic materials.
Gynea Landscape (Gy)	Erosional	Shallow to moderately deep (30-100cm) Yellow Earths and Earthy Sands on crests and inside of benches; shallow (< 20cm) Siliceous Sands on leading edges of benches; localised Gleyed Podzolic Soils and Yellow Podzolic Soils on shale lenses; shallow to moderately	Localised steep slopes, high soil erosion hazard, rock outcrops, shallow and highly permeable soils with very low fertility.

Unit	Landscape Type	Soil Type	Limitations
		deep (< 100cm) Siliceous Sands and Leached Sands along drainage lines.	

The Soils of the Sydney 1:100 000 sheet (Chapman and Murphy 1989) identified that the soils on the site are comprised of disturbed terrain (refer Table 3). As the primary contaminant transport mechanism is thought to be via groundwater, data collection to date has primarily focused on this medium. Contamination at the site has been the subject of extensive investigation since 1990. Current environmental assessments have identified isolated areas of impact across the site which has limited soil and groundwater contamination. Impacts are known not to be migrating. Management of these occurrences are subject to an existing Environmental Management Plan.

The entire Clyde facility has been subject to extensive and ongoing environmental investigation and regular reporting over the past decade. The environmental assessment work has been undertaken to advanced standards in NSW. It comprises numerous past phases of work, and continued compliance monitoring as outlined in the Environmental Protection Licence for the Clyde refinery site. The results of these assessments have concluded that no active remediation is required in the operating portions of the site. This work has been provided to the Manager Sydney Industry and the Contaminated Sites Section of the OEH and found acceptable.

The site has a well developed environmental management plan that has been reviewed by third party NSW EPA Accredited Auditors, Mr Chris Jewell and Mr Graeme Nyland. Mr Nyland's recent review concluded that "the management approach being employed is appropriate to monitor and manage the existing groundwater conditions at the site, and provides a suitable framework to identify, respond and report on groundwater conditions that may have the potential to impact upon Parramatta and Duck Rivers to a degree that could cause harm".

Shell anticipates the possible redevelopment area in the western portion of the Clyde site will be subject to the typically thorough contaminated site assessment, remediation and accredited audit processes required under State planning law regulations, SEPP 55. We would expect management of contamination on the ongoing terminal site to fall under the existing monitoring and control program. Prior audits by the EPA accredited auditors have found this to be robust and acceptable for the site conditions.

Shell would be happy to further discuss with OEH the nature and extent of previous investigations, monitoring and environmental management, in the context of developing appropriate controls for each of the ongoing terminal and possible redevelopment areas moving forward. In this context, we would need to take into consideration the specific scope of the Project and the timing of any audit processes required.

Regarding further assessment of Duck Creek, Shell's environmental assessment works to date have included assessment of the site's Duck Creek boundary, for potential off site migration related to past operations. These audited assessments have not found need to further assess these offsite areas. We do, however, expect that the normal site assessment processes following closure of the refinery process area will include further data collection along this Duck Creek boundary of the site and provide opportunity to assess whether further off site investigation is required based on the data obtained.

We do recognise Duck Creek as a sensitive receptor for the site, and expect to continue to manage our ongoing operations with appropriate controls for protecting that receptor. We also expect that works in the refinery footprint, primarily demolition and remediation activities, will need to be undertaken with appropriate controls for the protection of Duck Creek, and plans will be developed accordingly. Further sampling of river sediments is, however, not considered necessary at this stage unless investigations on site indicate further off site assessment is required.

Other potential sources of contamination include surface waters from site drainage and interceptors, and off site operations from other properties in the Camellia industrial estate (ERM, 2008).

Based on knowledge of the current and past operations on the refinery site, a range of constituents of potential concern (COPC) has been identified at the site in both soil and groundwater, including:

- BTEX (benzene, toluene, ethylbenzene, xylenes);
- TPH (total petroleum hydrocarbon fractions - C6-C9, C10-C36 and potentially >C36);
- Heavy metals including aluminium, arsenic, antimony, barium, beryllium, cadmium, chromium (trivalent and hexavalent), cobalt, iron (ferrous), lead, manganese, mercury, nickel, selenium, vanadium and uranium;

- Polycyclic Aromatic Hydrocarbons (PAHs);
- Phenols;
- Organochlorine (OC) and Organophosphate (OP) pesticides;
- Polychlorinated Biphenyls (PCBs);
- Tetra Ethyl Lead (TEL); and
- Asbestos.

Other chemicals such as Trichloroethylene, ethanolamine, sodium hydroxide, acids and solvents have also been stored in relatively small quantities in above ground containment vessels (ERM, 2008).

A review of the Parramatta LEP 2011 Acid Sulphate Soil Risk Maps was undertaken, with Acid Sulphate Soils (ASS) being classified into five classes, with class one having the highest risk, and class five the lowest. Potential acid sulfate soils (ASS) are waterlogged soil layers rich in iron sulphide, primarily pyrite. They generally occur in low lying coastal areas. When excavation or drainage exposes these soils to oxygen, pyrite becomes oxidised to form sulphuric acid. If this concentration of sulphuric acid is enough to exceed the neutralising capacity of the soil, the soil pH can become acidic. This is then known as Actual ASS. The review of ASS mapping for the Project Area identified that:

- The south-eastern edge of the refinery site is classified as Class 2;
- The eastern half of the site is classified as Class 3; and
- The western half of the site is classified as Class 4 (refer to Figure 3).

6.4.1.2 Groundwater

Based on the Sydney 1:100 000 Geological Sheet 9130 (Edition 1, 1983), the site is underlain by estuarine to alluvial sediments of Holocene to Tertiary in age. This is underlain by mid- Triassic Ashfield Shale of the Wianamatta Group and early to mid-Triassic Hawkesbury Sandstone. Previous groundwater investigations on site have targeted the two identified water bearing zones Groundwater flow within the fill material and Quaternary and Tertiary sediments is inferred to be to the north-east and south-east towards the Parramatta and Duck Rivers. It is also likely that the groundwater eventually discharges to these two rivers (Woodward-Clyde 1999). Woodward-Clyde also indicated that the groundwater levels within the estuarine and alluvial deposits do not change in response to tidal fluctuations in the adjacent rivers and that the hydraulic gradient across the site indicates that the direction of groundwater flow may be subject to rainfall events and localised groundwater mounding. Previous groundwater monitoring wells targeted shallow and deep areas through the two identified water bearing zones. These investigations determined that the majority of deep wells were acidic with a pH <5, and shallow wells exhibited a relatively constant pH between 6.0 and 8.0.

Groundwater has been encountered within multiple water bearing zones beneath the site, including a shallow unconfined water zone within the fill material and estuarine – alluvial sediments at depth between 1-3m. Preferential pathways within unit 2 and unit 3 have been identified as being in the sandy lenses. There is also one semi-confined water bearing zone in gravelly clays at depth of 4 – 8.5m below the ground surface. The hydro-geological connectivity of these water bearing zones are not fully understood (ERM, 2008).

Previous investigations into groundwater contamination identified impact by a range of dissolved phase contaminants, including BTEX, TPH, PSH, PAH, Lead, Cobalt, Selenium, hexavalent Chromium and Zinc, with the groundwater also experience unusual pH levels (ERM, 2008).

Shell has submitted Annual Progress Reports compiled by ERM detailing known groundwater contamination. The latest report submitted was dated March 2011.

Petroleum based contamination on site cannot be identified as being sourced from a simple plume as might be expected from an UST release or single point spill, rather the site has been subject to a number of release events which have occurred at various locations over an extended period of time. These releases have generally been contained and removed; however, some have caused isolated areas of impact. The release pattern into a hydro-geological environment has been subject to characterization over a number of years and show relatively localization of impact with low levels of migration (ERM, 2008). As stated earlier, further assessment conducted in 2010 and 2011 showing much greater understanding of the areas of impact and further assessment of the western area proposed for demolition is planned once the assets have been removed and access is available. A plume of dissolved phase hydrocarbon contamination continues to be identified at elevated concentrations within

the central and eastern areas of the site, particularly in the location of tankfarm E1 and the former ethylene, chemical and hydrocarbon solvent plant (historically identified PSH plume area). Concentrations of BTEX and PAH compounds have regularly been reported at levels exceeding the adopted site criteria within monitoring wells in this area of the site. Elevated dissolved phase TPH concentrations have also been routinely identified within monitoring wells located along the south-eastern boundary of the site with the Duck River, with elevated BTEX concentrations also reported in the north of the site (ERM 2008).

Concentrations of dissolved metals (including zinc, copper, lead, selenium, cobalt and cadmium) above the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000) have been periodically identified in numerous wells across the site. Due to the extensive distribution of heavy metals, the source is thought to be associated with leachate derived from imported fill material.

Comparison criteria for ecological receptors remains as ANZECC (2000), however the following best represents the Tier 1 screening criteria that have been adopted:

For Soil, the Tier 1 screening criteria to be applied is as follows:

- Cooperative Research Centre for Contaminant Assessment and Remediation of the Environment (CRC CARE) Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater (Friebel and Nadebaum 2011);
- NEPM (1999) - Assessment of Site Contamination, Schedule B (1) - Guideline on the Investigation Levels for Soil and Groundwater, Soil Health Investigation Levels for commercial/industrial land (HIL F); and
- New South Wales Environmental Protection Agency (NSW EPA), Contaminated Sites Guidelines for Assessing Service Station Sites – Threshold Concentrations for Sensitive Land Use (Protection of Human Health).

For groundwater, the Tier 1 screening criteria to be applied is as follows:

- Cooperative Research Centre for Contaminant Assessment and Remediation of the Environment (CRC CARE) Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater (Friebel and Nadebaum 2011); and
- ANZECC/ARMCANZ, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000 (ANZECC 2000).



6.4.2 Issues for Consideration

Based on the above, the site is generally considered to be appropriate for continued industrial use, although some further investigations and risk assessments will be performed to confirm this. The conversion of the refinery is to involve demolition of infrastructure and existing tanks. The EIS is to consider future assessment requirements which may be required once the site has been cleared and will be included in the separate application for redevelopment of this area.

Given the elevation of the site, proximity to the Duck and Parramatta Rivers, and the presence of acid sulphate soils, there is potential for acid to be activated if excavated and exposed to oxygen. The development however does not involve any extensive excavation into the sub soil areas of the site and therefore impact to ASS are considered to be low.

6.4.3 Method of Assessment

This proposed development involves the demolition of the refinery and is not to include any future land redevelopment which will be subject to further development assessment. As such, the following tasks are proposed as part of the assessment for the EIS with regard to soil and groundwater contamination. These are to include:

- Validation that the current management approach is suitable in the areas of continued tank and terminal operations; and
- Identification of data gaps which may require further future investigation.
- Investigative environmental assessment of the western area of the current site will be detailed in the separate application for redevelopment of this area.

A detailed review of all previous groundwater contamination investigations would also be necessary to determine the effect of the proposed works on the hydrogeology and quality of the groundwater present below ground level on the site.

Depending on the depth of any earthworks and effect of any demolition activities on the subsurface, mitigation measures may be required during demolition and conversion works to ensure that any potential risks to human health and the integrity of the environment is suitable managed.

The EIS would investigate in greater detail issues associated with potential soil and groundwater contamination and Acid Sulphate Soils. However, given the context of both site locations in an established heavy industrial area in Rosehill it is likely that these issues can be suitably managed through the modification of both sites Contaminated Soils Management Plan's (CSMP) and Acid Sulphate Soils Management Plan (ASSMP) which would guide how construction and operational works are to be carried out across the site.

6.5 Surface Water, Process Water and Flooding

6.5.1 Existing Environment

The Shell refinery is located within the Parramatta River sub-catchment and is managed by the Sydney Metropolitan Catchment Management Authority. The Parramatta River is the main tributary of Sydney Harbour, extending from Blacktown Creek in the west to the confluence of the Lane Cove River in the east. The Parramatta River catchment area is over 257km, with the estuary covering 12km².

The Parramatta River is one of the most urbanised catchments in Australia. Historical land uses have highly modified the nature of the estuary, with a range of sediments and pollutants entering the estuary which have impacted on water quality and habitat values.

The refinery is located at the confluence of the Duck and Parramatta Rivers. The surface of the site has been reshaped over time with the use of fill to provide a relatively flat site. This is confirmed on the Parramatta River 1:25 000 topographic map (Central Mapping Authority, 1986), which shows that this area is less than 10m AHD (Australian Height Datum) in elevation.

Surface water and runoff is directed towards the drainage network system on the site which is comprised of:

- A clean water drainage system that discharges to:
 - the man-made wetlands on site, or

- direct to the Parramatta and Duck Rivers.
- Accidentally Oil Contaminated (AOC) and Continually Oil Contaminated (COC) drainage network.

The AOC and COC drainage systems deliver contaminated water to the on-site wastewater interceptors. This system treats the wastewater prior to being re-used as cooling water, and discharged to the trade waste system or to Duck River. This discharge is licensed by the Shell EPL 570 (ERM, 2008).

6.5.2 Issues for Consideration

The flooding potential of the site is considered to be minimal. Sinclair Knight Merz (2004) reported that Clyde Refinery to be above the 1 in 100 year flood contours, with the exception of the area immediately adjacent to the Duck and Parramatta River.

Drainage on site would not change significantly although the plans include options to divert clean stormwater away from CPIs; an option which is being taken into account in forward planning. The existing stormwater systems on the site may also require adjustments to align with any alterations to tank farms and locations on site so that the quality and quantity of stormwater runoff can continue to be appropriately managed.

Demolition activities would require a specific soil and water management plan and review of the ongoing soil and water management strategy will be undertaken for the altered site, vacant land and any remediation requirements identified in the separate redevelopment application.

6.5.3 Method of Assessment

Preparation of the EIS would include an assessment of storm water and the likelihood of potential flooding impacts across the site. The assessment would also identify potential stormwater and flooding impacts as a result of climate change. Mitigation measures would be recommended to address potential impacts.

A range of options for sustainable and economic supply of process water to the site will be investigated; including options for use recycle water where appropriate.

A range of options for the separation of clean stormwater across the site from any potentially impacted water is also being developed and will be incorporated in the design of the terminal drainage plan and described in the EIS.

6.6 Waste Management

The identification and assessment of waste streams likely to be generated at the converted Clyde Refinery site will be undertaken as part of the EIS study and appropriate controls developed and implemented in the EMP.

Considerable demolition materials will come from the operating and existing redundant process areas. A detailed waste management plan will be developed. Specifically any waste generated will also comply with CCO order for PCBs as stipulated as condition L7 of EPL 570.

Significant changes following the cessation of refining operations to regular operational waste streams are expected. These include a reduction in air emissions, waste water generation, spent catalysts and a range of processing chemicals and hazardous substances from Clyde refinery.

The overall change of waste materials generation will be identified during the EIS.

6.7 Heritage

6.7.1 Existing Environment

The Project Area and the surrounding land have been heavily disturbed by previous land uses including land filling practices and large scale, long term industrial development. As a result, it is predicted that there is very little potential for any Aboriginal sites that may have existed to remain in situ. A search of the NSW AHIMS Database identified 26 sites within a 5 km radius, the closest approximately 2.5 km north west of the site. A desktop search of the NSW State heritage Register and the Parramatta LEP 2011 identified 19 heritage listed sites within 500m of the Project (refer to Table 4), none of which are of Aboriginal significance.

The Shell refinery and wharf are heritage listed under the LEP 2011, as are the wetlands, industrial developments, tram alignment, Racecourse and proposed township which lie immediately next to the Project Site. Other heritage listed sites within 500m of the Project Site include Parramatta City Raceway, industrial infrastructure, a rail bridge, grave, pumping station and an RTA depot.

Table 4 Heritage listed sites within 600m of the Clyde Refinery

Type of Listing	Significance Level	Property Details	Distance from the Clyde Refinery
General	Local Government	Shell Oil Refinery Wharf Duck River	0m (part of the Project Site)
General	Local Government	Wetlands, Parramatta River (Silverwater Road Auburn)	50m (south and south east of site)
General	Local Government	Manufacturing and Processing Sites Area bounded by Parramatta and Duck Rivers, Grand Avenue and Durham Street	0m (directly east of the site)
General	Local Government	Tram alignment Grand Avenue, Camellia	0m (directly north of the site)
General	Local Government	Capral Aluminium 3-11 Shirley Street, Rosehill Lot 2 DP 864567	0m (directly west of the site)
General	Local Government	Rosehill Racecourse Bounded by Grand Avenue, Colquhuon and Unwin Streets and the Railway Line	0m (directly west)
General	Local Government	Proposed Rosehill Township Bounded by Grand Avenue and Colquhoun, Devon and Durham Streets	0m (directly west)
General	Local Government	Wunderlich Factory 10 Grand Avenue, Rosehill	250m west
General	Local Government	Parramatta City Raceway, Heliport and Granville Showground Bounded by Wentworth and Deniehy Streets, the Western Motorway (M4) and A'Beckett Creek	280 west
General	Local Government	RTA Depot 1B and 5 Unwin Street, Rosehill Lot 201 and 202 DP 870298	350m west
General	Local Government	Truganini House and Grounds 38-50 South Street Rydalmere Lot 10 DP 774181	375m north-west
General	Local Government	Camelia Pumping Station 39 and 41 Grand Avenue Camellia, Lots 1 and 2, DP 615549	400m east
General	Local Government	Silverwater Bridge, Ermington	500m north-east
General	Local Government	Clyde Carlingford Rail Bridge 1B Grand Avenue, Camellia	550m north-west

Type of Listing	Significance Level	Property Details	Distance from the Clyde Refinery
Archaeological	Local Government	Grave of Eliner Magee & Child 1B Grand Avenue, Camellia	550m north-west
Archaeological	Local Government	Subiaco Archaeological Site 40 Brodie Street, Rydalmere Lot 100 DP 622959	1km north-west ¹
Archaeological	Listed under the Heritage Act 1977	Elizabeth Farm archaeological site 61, 63 and 65 Alice Street, Roshell Lots 15–17, Section 2, DP 4630	1.3km north-west ²
Archaeological	Local Government	Robin Thomas Reserve Archaeological Site 143A George Street, Parramatta Lot 7048 and 7049 DP 93899	1.9km north-west ³

³ These 3 sites (Subiaco Archaeological Site, Elizabeth Farm Archaeological Site and Robin Thomas Archaeological Reserve) have been included in this table as they are the closest sites of Aboriginal significance to the Clyde Refinery.

6.7.2 Issues for Consideration

The proposed redevelopment of the refinery would involve demolition and clearing. Should there be potentially items of historical significance within the demolition footprint, these will be identified during the EIS site assessment. There will be an effort made to record the various pieces of equipment through the ongoing photographing of various processing units and assets for historical archiving.

It is not anticipated that the redevelopment of either site would impact on any known or unknown items of Aboriginal heritage as the refinery has been heavily disturbed by previous land uses and filling practices.

6.7.3 Method of Assessment

A Heritage Assessment Report would be produced for the conversion works, following a desktop literature review and ground survey to confirm that there are adequate measures in place to avoid any known existing sites and to identify and mitigate any impacts on new sites discovered during the survey.

The Heritage Assessment Report would be the core reference document used to identify registered site locations and outline Cultural Heritage Management procedures and protocols required during construction. This document would form part of the EIS.

6.8 Hazard and Risk

There are several heavy industrial operations surrounding the refinery at Rosehill which have hazard and risk issues associated with their manufacturing and storage operations. These include the James Hardie Building Products facility, the Shell refinery warehouse delivery point, Kleenheat gas facility and the Veolia Environmental Services site. The nearest sensitive receivers to the refinery and terminal include:

- The suburbs of Rosehill and Granville, located to the west and south-west respectively of the refinery; and
- Rosehill Racecourse and the Parramatta Raceway, both popular community event spaces, are located to the west and south-west of the refinery site at Rosehill.

The site is currently licensed as a MHF and it is expected that this will continue. A new Safety Report is being developed by Shell and will be submitted to WorkCover in early 2012 as part of the ongoing MHF requirements. This will be updated and notification of changes will be made to WorkCover as the activities at the site change that have a material impact on the submitted Safety Report.

6.8.1 Issues for Consideration

The key consequences that can result in harm or damage to the adjacent properties in close proximity to the Clyde site may include:

- Damage and/or injury from the ignition of substances within an adjacent area resulting from a release within the future Terminal site;
- Damage and/or injury from radiant heat from a fire within the Terminal site; and
- Damage and/or injury from blast overpressure resulting from an explosion on the Terminal site.

Shell's Safety Report submitted to WorkCover details the full list of hazards and mitigations for the site as required for an MHF. The removal of the refining operations will result in the removal of current risks associated with the site including toxic gas clouds.

6.8.2 Method of Assessment

Hazard identification and screening would be undertaken and a PHA would be undertaken as part of the EIS, in accordance with the provisions of SEPP 33.

The EIS would therefore incorporate an assessment of all potential hazards and risks. The results of the risk assessment would include development of appropriate controls to minimise risks during construction and operation of the Project.

The assessment would assist in identifying the scope and nature of control measures including preventative controls including hardware and procedures, emergency and fire response plans, fire and rescue training and natural disaster contingency plans. These are currently in place and will be modified to address the changed operations at the site and any modified controls implemented. Specific attention would be given to the assessment and mitigation of risks on the health and safety of:

- the temporary construction-related workforce within the site;
- the ongoing operational workforce within the site; and
- people in the surrounding community and industrial properties.

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7.0 Other Environmental Issues

7.1 Sustainability and Climate Change

The Clyde Refinery would seek opportunities to incorporate sustainable design where feasible. Once refining ceases at the Clyde Refinery site, there will be an overall reduction in potable and general water usage to around 90-95% of current levels and a reduction in power and natural gas requirements. Other considerations include sourcing of local manufacturing and materials and labour.

The EIS would consider issues of sustainability and climate change relating to the redevelopment of the Clyde Refinery. Key issues which would be considered would include potential increases in water level and flooding, energy and water consumption requirements.

7.2 Land Use

Land Use in the Parramatta LGA is dominated by low and medium residential development, as well as large portions of land classified as light industrial, mixed use, business development lands and enterprise corridor. The refinery is on land classified as IN3 - Heavy Industrial under the LEP 2011; the only site in the LGA to be classified as this land use.

The Camellia industrial precinct is defined as a strategic precinct under the DCP 2011. The DCP notes that Camellia is a significant industrial hub which contains heavy industries, sporting and convention sites.

The land surrounding the refinery to the north, south, and west is comprised of warehouses and factories (refer to Table 1) and is classified as IN1 - light industrial under the LEP 2011. Under the LEP 2011, the land on which Rosehill Racecourse is located is classified as RE2 - Private Recreation.

The conversion of the refinery to a terminal would not affect the land use of any adjacent properties. During the initial and subsequent development phases, any potential impact to surrounding land uses will be mitigated accordingly. The proposed redevelopment of the Refinery will be subject to a separate Development Application.

7.3 Road Traffic

During construction, there would be a sizeable construction workforce who would be travelling to and from the Clyde Refinery site. There would also be a number of deliveries and removals of plant equipment, building materials and other supplies occurring predominantly by truck. There may be limited movements of materials from the site by barge on the Parramatta River where this is more expedient and efficient than using the road network.

The road transport infrastructure providing access to the Rosehill/Camellia industrial precinct is well established to service the construction and heavy industry activities associated with the redevelopment of the refinery. Road traffic would use local industrial roads including Grand Avenue, Durham Street and Devon Street, with Grand Avenue connecting to James Ruse Drive and/or Durham Street, Unwin Street, Kay Street and Wentworth Streets to Parramatta Road; which connects to the M4 and Victoria Road; both part of the regional arterial road network. Traffic volumes on these arterial roads have been consistently increasing over the last ten years as a result of on-going development and population increases in and around the Sydney Metropolitan Region. The Sydney arterial road network is generally extremely congested, particularly during the morning and afternoon peak periods on these two roads. An extension of the M4 remains a government priority, with plans to extend the motorway so that it would connect with North Strathfield at Parramatta Road to improve travel times, reliability and safety for local and regional traffic.

Following the completion of demolition and construction activities, the workforce size at the site will be significantly reduced with the resultant traffic flows to and from the site also reduced. Road movements of petroleum products will remain unchanged from the terminal subject to any increase in throughput that may result from market growth.

7.4 Infrastructure Provision

The demolition of the refinery processing areas will see a significant reduction in the consumption of services for the Clyde site with the cessation of refining processes. The terminal will however, require electricity, water and gas equivalent to other terminals to maintain fire protection, operational activities and staff accommodation.

Due to the operation of the refinery prior to this Project at the Clyde site, the use of existing sewer systems will remain. Details of sewer usage along with electricity and natural gas usage and the changes following conversion to a terminal will be included in the EIS.

7.5 Landscape Character and Visual Amenity

The Clyde Refinery and surrounding area across the suburbs of Camellia, Rosehill (eastern half) and Clyde are significant industrial areas, comprising heavy and light industrial activities. The surrounding area of businesses includes port activities, waste services, building products, recycling facilities, product transport and gas supplies (refer to Table 1). As a result the area is characterised by large industrial buildings, warehouses and structures such as cranes and storage tanks, with many sites containing extensive hard stand areas for external storage of products or supplies, access and car parking.

The visual landscape post demolition is considered to be improved with the demolition of the refinery.

7.6 Terrestrial Ecology

The Clyde Refinery Project area has been heavily disturbed previously by human activity and the surrounding area is similarly heavily modified and characterised by significant residential and industrial land uses within the Parramatta local government area. The site itself has been cleared of vegetation for the original Shell Clyde Refinery site established in the 1920s, and is largely hard stand. A small patch of vegetation still exists, just outside the Shell site to the north east bordering the Parramatta River; however this area is not within the Project area. The Project area is also bordered by riparian vegetation along Duck River and there appears to be some limited regrowth vegetation scattered within other discrete areas of the site. It is also likely that the site supports some grasses and established weed infestations.

8.0 Risk Assessment

This chapter identifies the key environmental and social issues associated with the Project and applies a prioritisation matrix to rank issues in terms of their relevance and importance to the assessment of the potential impacts of the Project. The results of the prioritisation exercise are reflected in the level of assessment of each of the key issues within the EIS.

8.1 Identification of Potential Environmental Issues

Potential environmental issues associated with the proposed project have been identified based on previous investigations by Shell, preliminary desktop investigations and understanding of the statutory framework and general approvals requirements. The issues identified include (in no particular order):

- Land Use;
- Socio-Economic Effects;
- Air Quality and Odour;
- Noise and Vibration;
- Soil and Groundwater;
- Surface Water, Process Water and Flooding;
- Landscape Character and Visual Amenity;
- Heritage;
- Hazard and Risk;
- Terrestrial Ecology;
- Waste Management;
- Road Traffic;
- Infrastructure Provision; and
- Sustainability and Climate Change.

8.2 Prioritisation of Issues

Issues were prioritised based on their likelihood of occurrence and potential significance of consequences in the absence of mitigation and management measures. The objective of the prioritisation process was to identify the issues that require more detailed assessment in the EIS.

8.3 Methodology

The categories used to prioritise issues are set out in Table 5. Each issue was allocated a ranking between 1 and 3 for the likelihood of occurrence of environmental impacts and a number between 1 and 3 for the potential environmental consequence of unmanaged effects. The two numbers were added together to provide a numerical ranking for the issue, which was then used to characterise each issue into high, medium and low priority using an issues prioritisation matrix.

Table 5 Categories for likelihood and consequence of potential environmental effects

Likelihood of Effect		Consequence of Effect	
3 High (Probable)	There is likely to be an environmental effect	3 High (Major)	International or national implications, major adverse environmental change, serious or long term cumulative impacts, mitigation measures not available.
2 Medium (Possible)	There is potential for an environmental effect	2 Medium (Moderate)	Regional implications, moderate adverse environmental change, modest or medium-term cumulative impacts, non-standard mitigation measures required.
1 Low (Improbable)	There is little potential for an environmental effect	1 Low (Minor or insignificant)	Localised implications, imperceptible or short-term cumulative impacts, standard mitigation measures appropriate or none required.

Issues were prioritised to reflect that a higher degree of assessment is required for issues with a greater likelihood and consequence. Table 6 presents the issues prioritisation matrix that was used to identify priority environmental and social issues for assessment.

Table 6 Issues Prioritisation Matrix

Likelihood of Effect	Consequence of Effects		
	1 Insignificant or Minor	2 Moderate	3 Major
1 Improbable	2 Low Priority	3 Low Priority	4 Medium Priority
2 Possible	3 Low Priority	4 Medium Priority	5 High Priority
3 Probable	4 Medium Priority	5 High Priority	6 High Priority

8.4 Issue Prioritisation

The results of the prioritisation of environmental issues related to the Project are shown below in Table 7. This assessment prioritises issues for assessment in the EIS but does not consider the application of mitigation measures to manage the issue. In all cases, appropriate mitigation measures, chosen based upon the experience of regulators and other similar projects would be implemented to minimise potential impacts. These measures would be described in detail in the EIS.

Table 7 Issues Prioritisation for Clyde Refinery

Issue	Likelihood	Consequence	Priority
Land Use			
Design and mitigation measures are provided between incompatible land uses to minimise noise and amenity impacts.	1	2	3 Low Priority
The scale and height of existing development is maintained and has regard to the visual dominance of the surrounding industrial and residential areas.	1	2	3 Low Priority

Issue	Likelihood	Consequence	Priority
Socio-economic			
Direct and indirect job creation during demolition and construction	3	2	5 (High Priority)
Direct and indirect job loss during ongoing operation	3	1	4 (Medium Priority)
Impacts to nearby community	1	1	2 (Low Priority)
Capacity of regional infrastructure and services to support workforce	1	2	3 (Low Priority)
Air Quality and Greenhouse Gas			
Air quality impacts on closest residential receivers during demolition and construction	2	2	4 (Medium Priority)
Air quality impacts on closest residential receivers during operation	2	1	3 (Low Priority)
Impacts on greenhouse gas emissions	2	1	3 (Low Priority)
Soil and Groundwater			
Potential disturbance and mobilisation of contaminated soil and groundwater during demolition and conversion	2	2	4 (Medium Priority)
Potential disturbance and mobilisation of ASS during demolition and construction	1	2	4 (Medium Priority)
Potential impacts on soil and groundwater from spills/leaks during operation	2	2	4 (Medium Priority)
Noise and Vibration			
Noise impacts on closest residential receivers during demolition and construction	2	2	4 (Medium Priority)
Noise impacts on closest residential receivers during operation	1	1	2 (Low Priority)
Surface Water, Process Water and Flooding			
Supply and disposal/re-use of process water for Clyde Refinery	1	2	4 (Medium Priority)
Managing quantity & quality of surface water run-off	1	2	3 (Low Priority)
Potential for flooding of the site	1	2	4 (Medium Priority)
Landscape and Visual Amenity			
Visual amenity impacts during demolition and construction	2	1	3 (Low Priority)
Heritage			
Impacts on known or unknown sites/items of Aboriginal heritage significance	1	2	3 (Low Priority)
Impacts on known or unknown sites/items of European heritage significance	2	2	4 (Medium Priority)

Issue	Likelihood	Consequence	Priority
Hazards and Risks			
Exposure of nearby industrial facilities to hazard and risk	1	2	3 (Low Priority)
Exposure of closest residential areas to hazard and risk	1	2	3 (Low Priority)
Terrestrial Ecology			
Impacts on terrestrial flora and fauna species and EECs during demolition and construction	1	2	3 (Low Priority)
Impacts on terrestrial flora and fauna species and EECs during operation	1	2	3 (Low Priority)
Waste Management			
Waste generated during demolition construction	2	2	4 (Medium Priority)
Waste requiring management in accordance with CCO for PCBs.	2	2	4 (Medium Priority)
Waste generated during operations	2	1	3 (Low Priority)
Road Traffic			
Road traffic impacts during demolition and construction	2	2	4 (Medium Priority)
Road traffic impacts during operation	1	2	3 (Low Priority)
Infrastructure Provision			
Capacity of road infrastructure to service Project	1	2	3 (Low Priority)
Capacity of sewer infrastructure to service the Project	1	1	2 (Low Priority)
Capacity of water infrastructure to service the Project	1	1	2 (Low Priority)
Capacity of power infrastructure to service the Project	1	1	2 (Low Priority)
Capacity of storm water infrastructure to service the Project	1	2	3 (Low Priority)
Sustainability and Climate Change			
Resource efficiency during operation of Refinery and Terminal	2	2	4 (Medium Priority)
Potential impact on Refinery and Terminal from sea level rise and storm surge	1	2	3 (Low Priority)

9.0 Conclusion

The Clyde Refinery Conversion project includes the demolition of refinery processing units, demolition and reconfiguration of tank facilities and installation of updated ancillary infrastructure. The declaration of the site as one of SSD is being sought under Part 4, Division 4.1 of the EP&A Act to facilitate the redevelopment of the site as a finished product facility.

This EIS Scoping report has described the key components of the Project and includes an initial assessment of the key environmental issues associated with the Project. It has been prepared to assist the Director General in providing targeted Environmental Assessment Requirements, which would form the basis for preparation of the detailed EIS for the Project.

Issues were prioritised based on their likelihood of occurrence and potential significance of consequences in the absence of mitigation and management measures. The objective of the prioritisation process was to identify the issues that require more detailed assessment in the EIS. The outcome of the prioritisation process is summarised in Table 8.

Table 8 Environmental Issues Prioritisation

High Priority Issues	Moderate Priority Issues	Low Priority Issues
Social and Economic	Air Quality	Land Use
	Noise and Vibration	Landscape and Visual Amenity
	Surface Water, Process Water and Flooding	Terrestrial Ecology
	Waste	Road Traffic
	Sustainability and Climate Change	Infrastructure
	Heritage	Hazard and Risks
	Soil and Groundwater	

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Appendix A

Previous Site Investigations

Appendix A Previous Site Investigations

Year of Investigation	Description
1992	Coffey Partners International Pty Ltd developed a geotechnical model of the site using information from 150 previous site investigations. Ten wells were also installed along the south-eastern boundary to determine if the migration of contaminants into Duck River was occurring.
1992	ANSTO conducted water sampling
1993	Groundwater Monitoring Event (GME) conducted by Groundwater Technology in March.
1993	GME conducted by Groundwater Technology in July
1994	GME conducted by Groundwater Technology in February
1994	Environmental Site Assessment (ESA) conducted by Groundwater Technology in June
1995	ESA conducted by Groundwater Technology in March in the old chemical plant and Tankfarm E1
1995	ESA conducted by Groundwater Technology in April near the refuelling facility on the western site boundary
1999	Sludge pilot conducted by IT (formerly Groundwater Technology) in February
1999	ESA conducted by IT in May near the refuelling facility on the western site boundary
1999	GME conducted by IT in October
2000	GME conducted by IT in October
2001	GME conducted by IT in February
2001	ESA conducted by IT in March near the sludge drying area
2001	GME conducted by IT in August
2002	Pollution Reduction Program Remedial Action Plan produced by Shell Engineering Pty Ltd in July
2003-2004	GME conducted by IT in December 2003 and January 2004
2004	Gauging event conducted by IT in February 2004
2004	Gauging event conducted by IT in April 2004
2004	Gauging event conducted by IT in May 2004
2004	GME conducted by IT in July 2004
2004	Gauging event conducted by IT in August 2004
2004	Gauging event conducted by IT in September 2004
2004	Limited ESA conducted by IT in September 2004
2004	Gauging event conducted by IT in October 2004
2004	Gauging event conducted by IT in December 2004
2005	GME conducted by IT in March 2005
2005	Gauging event conducted by IT in June 2005
2005	Gauging event conducted by IT in July 2005
2005	GME conducted by IT in August-September 2005
2005	Gauging event conducted by IT in November 2005
2005	Gauging event conducted by IT in November 2005

Year of Investigation	Description
2005	Gauging event conducted by IT in December 2005
2006	Gauging event conducted by IT in January 2006
2006	GME conducted by IT in March 2006
2006	Gauging event conducted Coffey in July 2006
2006	GME conducted by Coffey in September/October 2006
2006	Gauging event and limited GME conducted by Coffey in December 2006
2007	GME conducted by HLA ENSR in September 2007
2008	Factual GME conducted by ERM Australia in February 2008

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